

UTRICULARIA (LENTIBULARIACEAE) IN THE  
PACIFIC NORTHWEST

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Three species of *Utricularia*, i.e. *U. vulgaris* L., *U. intermedia* Hayne and *U. minor* L., have been reported from Oregon, Washington, and British Columbia (Piper 1906, Ferris 1950, Cronquist 1959, Peck 1961, Steward et al. 1960, Taylor 1966). Henry (1915) reported an additional species, *U. occidentalis* A. Gray, which was later mentioned by Ferris (1950) in a short note and by Cronquist (1959) as a synonym of *U. minor*. *Utricularia ochroleuca* R. Hartm. was reported from British Columbia by Porsild (1951) and by Boivin (1966).

In 1970 and 1971, we noticed that *Utricularia gibba* L. was common in several lakes in the vicinity of Victoria, British Columbia. Several specimens of *U. gibba* in British Columbia herbaria (V, UBC, UVIC; the last abbreviation used for the herbarium of the University of Victoria) had been misidentified as *U. minor*. This fact together with the uncertain relation of *U. occidentalis* to *U. minor* led us to this revision of *Utricularia* in the Pacific Northwest.

The present study is based on examination of *Utricularia* in the following herbaria: DAO, CAN, CAS, JEPS, POM, OSC, RSA, UBC, UC, UVIC, V, WS, and WTU. Species descriptions are based on herbarium material from the study area. Notes on the ecology of *Utricularia* species are the result of field observations made primarily on Vancouver Island.

KEY TO UTRICULARIA IN THE PACIFIC NORTHWEST

Leaf margin and winter buds setose.

Leaves pinnatifid, with more than 20 terete ultimate segments, usually with numerous bladders . . . . . *U. vulgaris*

Leaves dichotomously divided, with fewer than 20 flat ultimate segments, usually without bladders.

Spur of flower more than  $\frac{1}{2}$  the length of the lower lip, cylindrical, positioned at an acute angle to the lower lip; tip of the leaf segments obtuse, with an abruptly starting bristle, the ultimate segment usually with more than 3 bristles on each side arising from the leaf margin . . . . . *U. intermedia*

Spur of flowers less than  $\frac{1}{2}$  the length of the lower lip, pyramidal, positioned at a right angle to the lower lip; tip of leaf segments acute, gradually narrowed to a bristle, the ultimate segment usually with less than 4 bristles on each side arising from small teeth on the leaf margin. . . . . *U. ochroleuca*

Leaf margin and winter buds glabrous.

Leaves with more than 5 ultimate segments, these flattened and gradually narrowed toward the tip; inflorescence of 3–9 flowers; bracts auriculate; upper lip of corolla less than  $\frac{1}{2}$  the length of the lower lip, spur less than  $\frac{1}{2}$  the length of the lower lip; pedicels recurved in fruit; seeds not winged. . . . . *U. minor*

Leaves with fewer than 5 ultimate segments, these filiform; inflorescence of 1–3 flowers; bracts not auriculate; upper lip of corolla equalling the lower lip, spur almost as long as the lower lip; pedicels not recurved in fruit; seeds winged. . . . . *U. gibba*

UTRICULARIA VULGARIS L., Sp. Pl. 18. 1753. (figs. 1; 2)

*Utricularia macrorhiza* Le Conte, Ann. Lyceum Nat. Hist. New York 1:73. 1824.

*Utricularia vulgaris* L. subsp. *macrorhiza* (Le Conte) Clausen, Cornell Univ. Agric. Exp. Sta. Mem. 291:9. 1949.

*Utricularia vulgaris* L. var. *americana* A. Gray, Man. Bot. ed. 5:318. 1867.

Aquatic herb with stolons 20–180 cm long. Leaves pinnatifid, 2–9 cm long, divided into 20–150 filiform segments. Bladders attached near the base of the points of branching in leaves on stalks 0.1–1.0 mm long. Bladders on primary branches larger than those of the others, 1.0–4.0 mm long and 0.5–4.0 mm wide, 10–50 per leaf, sometimes lacking on one of the stolon branches. Winter buds 7.0–30 mm long, 6–15 mm wide, setose. Scape 10–30 (40) cm tall with 1–5 bract-like scales. Inflorescence of 3–15 bright yellow flowers. Pedicels 6–30 mm long, recurved after anthesis, bracts 2.5–8.0 mm long. Calyx lobes subequal, 3–6 mm long and 2–4 mm wide, the lower one emarginate. Upper lip of corolla ca 10 mm long (3–17 mm), the lower lip 12 mm long (5–20 mm), approximately equal in length and breadth. Spur 10 mm long, hook-like, slightly shorter than the lower lip. Fruit a globose capsule ca 6 mm in diameter. Palate gibbous, as large as the upper lip, sometimes with reddish brown veins.

*Utricularia vulgaris*, *U. intermedia* and *U. minor* belong to a circum-polar boreal species group with a gap in the distribution of *U. intermedia* and *U. vulgaris* in Iceland and of *U. vulgaris* also in Greenland. The range of *Utricularia minor* has small discontinuities in Asia and America (Hultén 1937, 1968, 1971).

*Utricularia vulgaris* is widely distributed from British Columbia to California. It grows in a variety of habitats ranging from lower sublittoral to littoral zones in lakes and ponds of diverse trophic levels. It is common in stands of *Brasenia schreberi* Gmel., *Potamogeton natans* L., *Scirpus validus* Vahl. In shallower water it occurs with *Sparganium minimum* L. and *Scirpus subterminalis* Torr. It grows in stands of *Nuphar polysepalum* Engelm. and in successional stages with *N. polysepalum*, *Carex lasiocarpa* Ehrh., and *Menyanthes trifoliata* L.

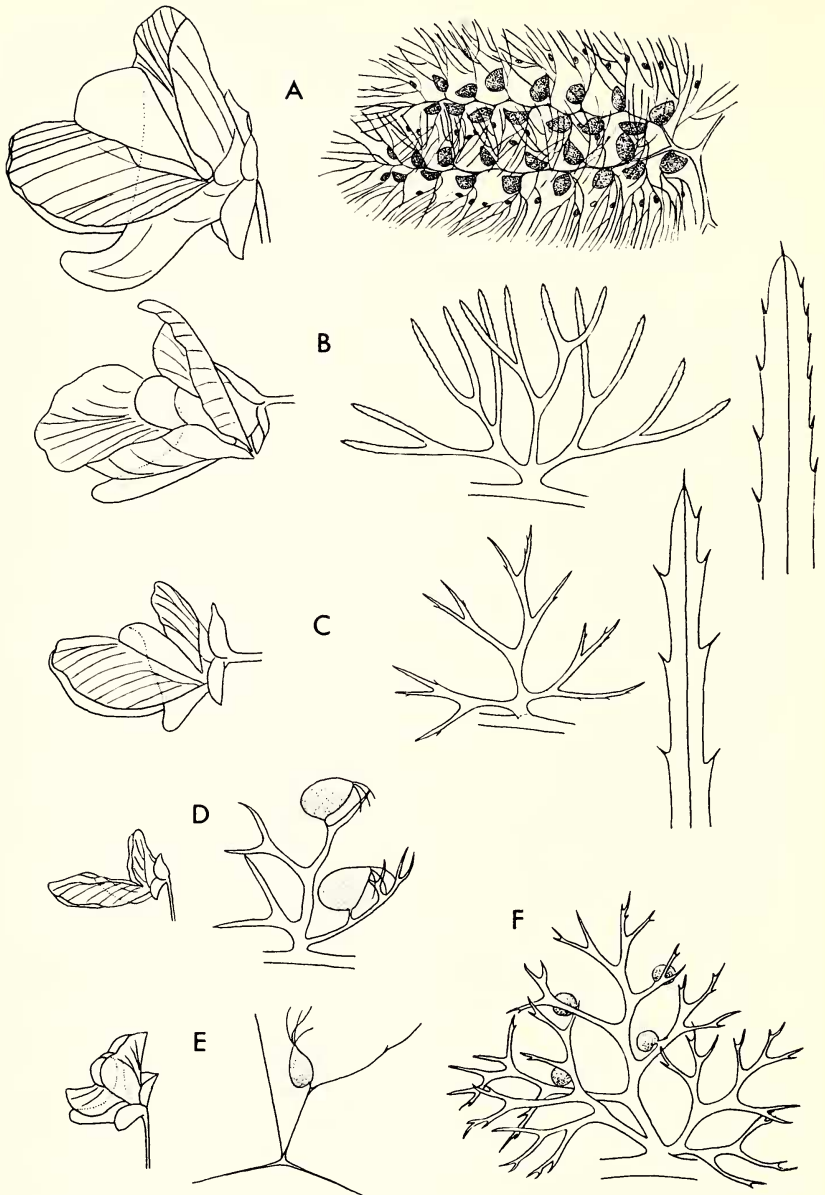


FIG. 1. *Utricularia vulgaris* (A), *U. intermedia* (B), *U. ochroleuca* (C), *U. minor* (D), *U. gibba* (E), leaf of the robust form of *U. minor* (F). Orig. O. Ceska.

The American populations of *Utricularia vulgaris* have been differentiated from the European *U. vulgaris* at the level of species (Britton and Brown 1913, Hultén 1949), subspecies (Hultén 1968) or variety (Fasset 1940, Porsild 1951). The crucial distinguishing character of American plants is the narrower and longer spur. DeCandolle (1844) was unable to distinguish American specimens of this species from those in Europe. Rossbach (1939) and Fernald (1941) considered the two to be conspecific. This conclusion was accepted by several workers (Merrill 1948, Taylor 1964, Calder and Taylor 1968). Fernald's treatment apparently was based mainly on published descriptions of the European *U. vulgaris*. The description of *Utricularia vulgaris* has often been confused with the description of the closely related *Utricularia neglecta* Lehm. (Casper 1967). Furthermore, Fernald (1941) used Hegi's illustration of "*Utricularia vulgaris*" (Hegi 1914, Tafel 244, Fig. 5c), which Glück (1936) and Casper (1967) claim is in fact *Utricularia neglecta*. Recently Taylor (1971) has equated *U. neglecta* with *U. australis* R.Br., the latter name having priority. The confusion existing in the *Utricularia vulgaris* complex can only be resolved by a comprehensive study of all members (including the Japanese species) throughout their distribution.

UTRICULARIA INTERMEDIA Hayne, J. Bot. (Schrader) 1800 (1):18. 1800. (figs. 1; 2)

Aquatic or semi-terrestrial herb with aquatic leafy stolons lacking bladders and subterranean leafless stolons with bladders. Leafy stolons 10–50 cm long. Leaves 5–30 mm long, divided in three parts and then dichotomously divided into 6–20 ultimate segments that are flat with a central nerve, blunt obtuse tip, and abruptly starting bristle. Ultimate segments usually with 2–10 short bristles on each side from the leaf margin. Bladders 1.5–4.5 mm long and 1.0–3.0 mm wide; their stalks usually without branches, ca 0.5–4.0 mm long. Winter buds 2–15 mm long and 3–10 mm thick, setose. Scape 5–20 cm tall with 1 or 2 bract-like scales. Inflorescence of 3–5 bright yellow flowers. Pedicels 3–15 mm long, ca 4 times the length of their corresponding 1.5–4.0 mm long bracts. Calyx lobes subequal, 2.5–3.5 mm long and 2.0–3.0 mm wide. Upper corolla lip ca 6.5 mm long (4–9 mm), lower lip 12 mm long (5.5–18 mm) and ca 15 mm wide (7–20 mm). The spur cylindrical, straight, 8–12 mm long, positioned at an acute angle to the lower lip. Palate ca 7 mm long. Fruit a capsule ca 3 mm in diameter.

*Utricularia intermedia* is scattered in British Columbia and is considerably rarer in Washington. Herbarium specimens examined included no record from Oregon. *Utricularia intermedia* occurs in oligotrophic and dystrophic lakes and in marshes. It is commonly associated with *Carex lasiocarpa*. In the sublittoral zone it grows in mats anchored in mud. Occasionally it grows in stands of *Nuphar polysepalum* and *Scirpus subterminalis* together with *Utricularia vulgaris* and *Utricularia minor*.

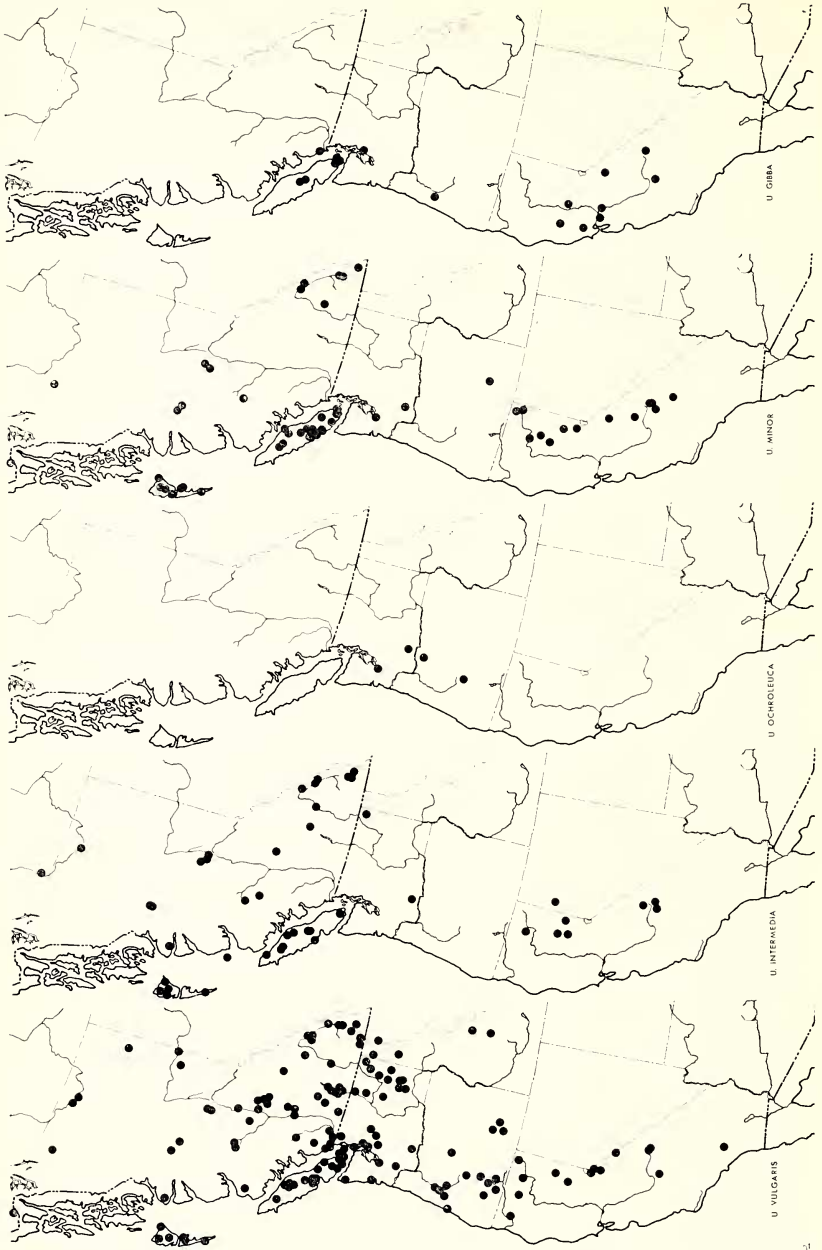


FIG. 2. Distribution of *Utricularia vulgaris*, *U. intermedia*, *U. ochroleuca*, *U. minor*, and *U. gibba* in the Pacific Northwest and California.

In the Pacific Northwest, *Utricularia intermedia* is quite uniform in morphology. There is a slight variation in vegetative organs related to the depth of water in which the plants grow.

UTRICULARIA OCHROLEUCA R. Hartman, Bot. Not. 1857:30. 1857 (figs. 1; 2)

*Utricularia occidentalis* A. Gray, Proc. Amer. Acad. Arts 19:95. 1883.

Aquatic or semi-terrestrial herb with stolons 5–30 cm long, differentiated into leafy aquatic and leafless subterranean stolons. Leaves 3–15 mm long, divided into 3 parts that are dichotomously divided into 5–19 ultimate segments. These with a central nerve and gradually narrowed into a bristle. The ultimate segment usually with 1–4 hairs on each side, arising from small teeth on the leaf margin. Leaves occasionally bear one bladder. Bladders developed on leafless stolons, smaller than in *U. intermedia*, about 1.5–2.5 mm long and 1.0–2.0 mm wide. Winter buds 1.5–4.0 mm long, 1.2–2.5 mm thick, with setose segments. Scape 5–25 cm tall with 1–5 bract-like scales. Inflorescence of 2–10 lemon-yellow flowers. Pedicels 2–15 mm long, straight in anthesis but slightly recurved after, ca 4 times longer than auriculate bracts. Calyx lobes subequal, ca 2.5–3.5 mm long, 1.5–2.0 mm wide, lower lobe emarginate. Upper lip of corolla 4.5 mm long (3–9 mm), lower about 8.5 mm long (5–12 mm) and a little narrower. Spur pyramidal with broad base, 3.0–4.0–5.5 mm long, positioned at a right angle to the lower lip. Palate 5 mm long.

The distribution of *U. ochroleuca* is very poorly known. Sterile specimens are difficult to distinguish from those of *U. intermedia* with which it can be easily confused.

*Utricularia ochroleuca* is distinctive when in flower. The characteristic pyramidal spur, 3.0–5.5 mm long, positioned at a right angle to the lower lip, differs from that of all other species of *Utricularia* in the region. In the sterile stage *U. ochroleuca* is easily distinguished from *U. minor* because of the glabrous leaves of the latter. It is less easily distinguished from *U. intermedia* by having hairs arising from teeth on the leaf margin, acute tips on the leaf segments, and fewer hairs on each side of the final leaf segments. Other characters that have been suggested to differentiate *Utricularia ochroleuca* from related species include the possession of acute winter bud segments (Glück 1902, 1913, 1936, Hegi 1914) and bladder stalks leafy on the subterranean stolons (Fernald 1950). However, these characters are not reliable. Sporadic occurrence of bladders on normal leaves of leafy stolons of *U. ochroleuca* differentiate this species from *U. intermedia*, a species that rarely has bladders on its leaves.

In Europe, *Utricularia ochroleuca* is rare, known only from northern, central, and western parts. Walter and Straka (1970) listed *U. ochroleuca* among the European subatlantic geoelements with a footnote "also in Eastern North America". In North America, the distribution of *U.*

*ochroleuca* is wider than indicated in floristic works. According to Porsild (1943), the first record of *U. ochroleuca* from North America west of Greenland was that by Perry (1931) from St. Paul Island, Nova Scotia. Boivin (1966) reported this species from the continental Northwest Territories, Alaska, Greenland and Nova Scotia, from Quebec to Manitoba, and in British Columbia.

Boivin's report of *Utricularia ochroleuca* from British Columbia seems to be based on that of Porsild (1951), who collected a specimen of a sterile *Utricularia* from Liard Hot Springs (CAN 99616, *A. E. Porsild*, June 2, 1944). This sheet of specimens was identified by Porsild as *U. ochroleuca*, an identification confirmed by Boivin's annotation. A later re-examination of this sheet by Porsild led to the "+ *U. intermedia* Hayne". In our opinion, all specimens on this sheet are *U. intermedia*. So far we have seen no specimen of *U. ochroleuca* from British Columbia.

The first collection of *Utricularia ochroleuca* in the Pacific Northwest and, apparently, the first collection of this species in North America was made by W. N. Suksdorf in Falcon Valley, Klickitat Co., Washington in 1880. Based on Suksdorf's specimens collected in 1880 and 1883, Gray (l.c.) described a new species—*Utricularia occidentalis*. All of Suksdorf's specimens of *U. occidentalis* that we have examined belong to *U. ochroleuca*, a species not known from North America in Gray's time.

*Utricularia occidentalis* has been treated in different ways. Henry (1915) reported it from Ucluelet, Vancouver Island, based on Macoun's report (Macoun 1913). Macoun's specimen (CAN 99609)—identified as "*Utricularia minor* L. or *Utricularia occidentalis* A. Gray"—is a robust form of *U. minor*. Ferris (1950) mentioned *U. occidentalis* in a short note under *U. minor* as, "An imperfectly known species which differs from *U. minor* by the hairy-fringed leaf-segments of the winter buds." Cronquist (1959) noted *U. occidentalis* as a synonym of *U. minor* with the comment, "A form with both the spur and the palate a little better developed than usual." Consequently the illustration of *Utricularia minor* in Cronquist (1959) is in fact one of *Utricularia ochroleuca*. Rossbach (1939) mentioned both *U. ochroleuca* and *U. occidentalis*. He regarded the latter as, "seemingly endemic . . ." [to] ". . . the region of Falcon Valley, in western Klickitat Co., Washington." He implied that *U. occidentalis* may be a hybrid between *U. intermedia* and *U. minor*. Other authors (Böcher et al. 1968, Boivin 1966) have suggested a similar hybrid origin for *U. ochroleuca*. Whether the latter is a good species or a hybrid remains a matter for conjecture.

In the herbarium material studied, we found several specimens of *Utricularia ochroleuca* misidentified either as *U. minor* or as *U. intermedia*. In Washington it has been collected in Falcon Valley, Klickitat Co., by Suksdorf in 1880, 1882, 1885, 1923, (WS, WTU, CAN, CAS), and somewhere near Olympia by Kincaid in 1896 (one plant on the herbarium sheet WS 24589 with *U. minor*). *Utricularia ochroleuca* was

collected in Oregon on Mt. Hood by Thompson in 1927 (WS) and in Gold Lake, Lane Co., by Ingram in 1926 and by Dennis in 1962 and 1963 (OSC). We have found one collection of *U. ochroleuca* from Colorado (Chalk Creek, 17 mi N of Salida, Chaffee Co., 7500 ft., Hitchcock, Rethke and Raadshooven 1938, CAS), and one from Illinois (Sunny Spring Bog, 3 mi. N of East Peoria, Tazewell Co., Chase 11938, 1951, WS).

UTRICULARIA MINOR L., Sp. Pl. 18. 1753. (figs. 1; 2)

Aquatic or semi-terrestrial herb with stolons 15–75 cm long differentiated into aquatic stolons with leaves and subterranean stolons with fewer leaves and more bladders. Leaves 2–10 mm long, dichotomously divided into 2–17 ultimate segments. Ultimate segments acute to acuminate, lacking a central nerve. Small, leathery, brown-tinged, deeply divided remnants of winter buds often found on the stem. Bladders 1.5–2.0 mm long and 0.7–1.5 mm wide, 2–6 on each leaf. Winter buds globose 2–4 mm in diameter, glabrous. Scape 5–15 cm tall with 1–4 bract-like, purple scales. Inflorescence of 2–10 pale yellow flowers, the two lower flowers sometimes approximated. Pedicels 2–10 mm long, recurved after anthesis. Bracts purple, 1–2 mm long, auriculate. Calyx lobes equal, 0.5–2.5 mm long, 0.5–2.5 mm wide, lower lobes emarginate. Upper lip of corolla 2–4 mm long, shorter than lower lip, 5.0–7.5 mm long and 4.0–4.5 mm wide. Spur small, saccate, 1–2 mm long. Palate low, ca 3–5 mm long. Fruit a globose capsule ca 2.0–2.5 mm in diameter.

*Utricularia minor* is less common than *U. intermedia*. Extensive collecting in some areas (e.g. Queen Charlotte Islands and Vancouver Island) suggests that it is frequently overlooked because of its smaller size. *Utricularia minor* grows in oligotrophic and dystrophic lakes and in peatbog pools. We have found it growing with *Sparganium minimum* and *Scirpus subterminalis* in shallow muddy water, in stands of *Menthanthes trifoliata*, and in peatbog pools with *Sphagnum* spp. and *Lycopodium inundatum* L.

A robust form of *Utricularia minor* has been collected on several occasions in British Columbia. Its stolons are ca 50–120 cm long with internodes ca 3–10 mm long. Leaves are 9–20 mm long, orbiculate and divided into 20–40 final segments (fig. 1, F).

UTRICULARIA GIBBA L., Sp. Pl. 18. 1753. (figs. 1; 2)

Aquatic or semi-terrestrial herbs with 10–25 cm long filiform stolons, often characteristically zig-zag shaped in floating stolons. Leaves 3–10 mm long, filiform, dichotomously branched from the base, one branch usually straight, and without bladders, the other usually branched, with 1–3 bladders. Bladders 0.5–1.5 mm long, 0.5–1.0 mm wide, with long branched hairs at the membrane opening. Bladders progressively reduced to small protuberances toward the ends of leaves. Winter buds absent. Scape 3–7 cm tall, with one or no scale. Inflorescence of 1–2



bright yellow flowers. Pedicels straight after anthesis, 5–10 mm long. Bracts semi-amplexicaulous, not auriculate. Calyx lobes equal, orbiculate, 1.5–2.5 mm long. Upper lip of corolla 2–6 mm long, flat, positioned at a right angle to the lower lip. Lower lip 3.5–6.0 mm long, slightly wider than long. Spur 3–5 mm long, cylindrical, straight, positioned parallel to the lower lip. Palate conspicuous, 3.0–4.5 mm long. Fruit a 2-valved capsule ca 5 mm in diameter, seeds lenticular, winged.

The distribution of *Utricularia gibba* is entirely different from that of the other *Utricularia* species in the region. It and other closely related species occur mainly in Central and South America and Africa. Of related species, only *U. exolata* R. Br. (Portugal: Glück 1936) and *U. biflora* Lam. (Hungary: Soó 1968) grow in Europe in isolated localities. Taylor (1964) referred to *Utricularia gibba* as the most widely distributed *Utricularia* species: pantropically occurring, "almost throughout the New World from NE United States to Argentina and in Africa from Nigeria (apparently absent from Madagascar)." It grows from eastern North America westward to Oklahoma, Minnesota, and Michigan (Fernald 1950) and in Canada in Ontario, Quebec, New Brunswick, and Nova Scotia (Boivin 1966).

In the Pacific states *Utricularia gibba* was first recorded in California by Mason (1931) who listed several localities that were mentioned again in Rossbach's (1939) treatment. In British Columbia it is common in several lakes near Victoria (Blinkhorn, Florence, Glenn, Prior, Teanook, and Thetis) in Ash, Patterson, and Turtle Lake near Port Alberni and in Beaver Lake in Vancouver. In Washington, *U. gibba* was collected by Piper from Mud Lake, Seattle in 1892 (WTU) and misidentified as *U. minor* (cf. Piper 1906). In Oregon it was collected in Long Tom River S of the Monroe Bridge by Dennis in 1969.

In the vicinity of Victoria, *Utricularia gibba* grows with *Brasenia schreberi*, *Utricularia vulgaris*, and *Ceratophyllum demersum* L. We have not seen floating material in flower. *Utricularia gibba* often flowers while growing with *Sphagnum* in stands of *Dulichium arundinaceum* (L.) Britt. or on muddy soil in disturbed places. Near Port Alberni *U. gibba* occurs attached to the lake bottom in *Carex lasiocarpa* stands or on steep submerged banks that are overgrown with *Rhynchospora alba* (L.) Vahl and *Drosera anglica* Huds. *Utricularia gibba* grows here in water 10–70 cm deep. Some plants have differentiated leafy aquatic and leafless subterranean stolons.

The long cylindrical spur, broad lower lip, and the upper lip equalling the lower lip easily distinguish *U. gibba* from *U. minor*. The identification of sterile specimens is more difficult. Rossbach (1940) states, "Though the most reduced leaves [of *U. minor*] resemble those of *U. gibba*, they still are usually coarse and not quite like those of *gibba* in appearance, and their comparatively large bladders are less darkly colored and much more, in fact nearly quite, homogeneous in size." *Utricularia gibba* can be recognized by the presence of rudimentary

bladders on the leaves. Leaves of *U. gibba* are usually divided from the base into two opposite parts.

*Utricularia gibba* belongs to a complex of several species, including *U. fibrosa* Walt., and *U. biflora* Lam., that becomes more intricate in Central and South America (Rossbach 1939). Some authors (see Taylor 1964) treat *U. fibrosa* and *U. biflora* as mere synonyms of *U. gibba*. However, we circumscribe *U. gibba* in the restricted sense.

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## NOTES AND NEWS

### LITERATURE OF INTEREST

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Privately published and available from the authors: Robert D. Dorn and Jane L. Dorn, Department of Botany, University of Wyoming, Laramie 82070.

Five Hundred Utah Place Names, Their Origin and Significance. vi + 109 pp. 1 map. (paper cover). 1961. \$1.25.

Nevada Place Names, Their Origin and Significance. xi + 149 pp., 8 plates (hard cover). 1964. \$2.45.

Both privately published and available from the author: Rufus Wood Leigh, 1468 Logan Avenue, Salt Lake City, Utah 84105.